



**Billing Code 4910-13**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 25**

**[Docket No. FAA-2019-0427; Special Conditions No. 25-752-SC]**

**Special Conditions: TTF Aerospace, LLC, Airbus Model A330-300 and Model A330-900 Series Airplanes; Bulk Cargo Lower Deck Crew Rest Compartments**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final special conditions.

**SUMMARY:** These special conditions are issued for the Airbus Model A330-300 and Model A330-900 series airplanes. These airplanes, as modified by TTF Aerospace, LLC (TTF Aerospace), will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. This design feature is a lower deck mobile crew rest (LD-MCR) compartment installed in the aft cargo compartment of Model A330-300 and Model A330-900 series airplanes. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** Effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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## **SUPPLEMENTARY INFORMATION:**

### **Background**

On February 20, 2019, TTF Aerospace applied for a supplemental type certificate for a LD-MCR installed in the aft cargo compartment of Airbus Model A330-300 and Model A330-900 series airplanes. The Airbus Model A330-300 and Model A330-900 series airplanes are twin engine, transport category airplanes with maximum takeoff weights of 405,650 and 533,518 pounds, respectively, and seating for 440 passengers.

The LD-MCR compartment will be located under the passenger cabin floor in the aft cargo compartment of Airbus Model A330-300 and Model A330-900 airplanes. It will be removable from the cargo compartment. The LD-MCR compartment will be occupied in flight but not during taxi, takeoff, or landing. No more than ten crewmembers at a time will be permitted to occupy it. The LD-MCR compartment will have a smoke detection system, a fire suppression system, and an oxygen system.

The LD-MCR compartment will be accessed from the main deck via a “stairhouse.” The floor within the stairhouse has a hatch that leads to stairs that occupants use to descend into the LD-MCR compartment. An interface will keep this hatch open when the stairhouse door is open. In addition, there will be an emergency hatch that opens directly into the main passenger cabin. The LD-MCR compartment has a maintenance door. This door is intended to be used to allow maintenance personnel and cargo handlers to enter the LD-MCR from the cargo compartment when the airplane is not in flight.

## **Type Certification Basis**

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.101, TTF Aerospace must show that the Airbus Model A330-300 and Model A330-900 series airplanes, as changed, continue to meet the applicable provisions of the regulations listed in Type Certificate No. A46NM or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Airbus Model A330-300 and Model A330-900 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Airbus Model A330-300 and Model A330-900 series airplanes must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

## **Novel or Unusual Design Features**

The Airbus Model A330-300 and Model A330-900 series airplanes will incorporate the following novel or unusual design features:

This design feature is a LD-MCR compartment installed in the aft cargo compartment of Airbus Model A330 300 and Model A330-900 series airplanes.

## **Discussion**

While the installation of the crew rest compartment is not a new concept for large transport category airplanes, each crew rest compartment has unique features based on design, location, and use on the airplane. The LD-MCR compartment is novel in terms of part 25 of title 14 of the CFR in that it will be located under the passenger cabin floor in the aft cargo compartment of Airbus Model A330-300 and Model A330-900 series airplanes, which is not contemplated by § 25.819 regarding lower deck service compartments (including galleys). Due to the novel or unusual features associated with the installation of a LD-MCR compartment, special conditions are considered necessary to provide a level of safety equal to that established by the airworthiness regulations incorporated by reference in the type certificates of these airplanes, as applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature.

Most of these special conditions come from § 25.819, but they require more stringent standards for fire protection and emergency egress because of design features and location of the LD-MCR. The applicant should note that the FAA considers smoke or fire detection and fire suppression systems (including airflow management features that prevent hazardous quantities of smoke or fire extinguishing agent from entering any other compartment occupied by crewmembers or passengers) for crew rest compartments complex in terms of paragraph 6d of Advisory Circular (AC) 25.1309-1A, "System Design and Analysis," dated June 21, 1988. In addition, the FAA considers failure of the

crew rest compartment fire protection system (i.e., smoke or fire detection and fire suppression systems) in conjunction with a crew rest fire to be a catastrophic event. Based on the “Depth of Analysis Flowchart” shown in Figure 2 of AC 25.1309-1A, the depth of analysis should include both qualitative and quantitative assessments. Refer to paragraphs 8d, 9, and 10 of AC 25.1309-1A. Note that flammable fluids, explosives, or other dangerous cargo are prohibited from being carried in the crew rest areas.

The requirements to enable crewmembers’ quick entry to the crew rest compartment, and to locate a fire source, inherently places limits on the amount of baggage that may be carried and the size of the crew rest area. The FAA considers that the crew rest area must be limited to the stowage of crew personal luggage and both must not be used for the stowage of cargo or passenger baggage. The design of such a system to include cargo or passenger baggage would require additional requirements to ensure safe operation.

Furthermore, the addition of galley equipment, or a kitchenette incorporating a heat source (e.g., cook tops, microwaves, coffee pots, etc.), other than a conventional lavatory or kitchenette hot water heater, within the LD-MCR compartment defined in the “Novel or Unusual Design Features” section, may require additional special conditions to be considered. A hot water heater is acceptable without further special conditions consideration.

Finally, amendment 25-38 modified the requirements of § 25.1439(a) by adding, “In addition, protective breathing equipment must be installed in each isolated separate compartment in the airplane, including upper and lower lobe galleys, in which crewmember occupancy is permitted during flight for the maximum number of

crewmembers expected to be in the area during any operation.” The LD-MCR compartment is an isolated separate compartment, so § 25.1439(a) is applicable. However, the § 25.1439(a) protective breathing equipment (PBE) requirements for isolated separate compartments are not appropriate because the LD-MCR compartment is novel or unusual in terms of the number of occupants.

In 1976, when amendment 25-38 was adopted, small galleys were the only isolated compartments that had been certificated. Two crewmembers were the maximum expected to occupy those galleys.

This crew rest compartment can accommodate up to ten crewmembers. This large number of occupants in an isolated compartment was not envisioned at the time amendment 25-38 was adopted. It is not appropriate for all occupants to don PBEs in the event of a fire because the first action should be to leave the confined space unless the occupant is fighting the fire. Taking the time to don the PBE would prolong the time for the emergency evacuation of the occupants and possibly interfere with efforts to extinguish the fire. These special conditions therefore provide procedures that establish a level of safety equivalent to the PBE requirements.

### **Operational Evaluations and Approval**

These special conditions outline requirements for flightcrew and cabin crew rest compartment design approvals (e.g., type design change or supplemental type certificate) administered by the FAA’s Aircraft Certification Service. Prior to operational use of a flight (cabin) crew rest compartment, the FAA’s Flight Standards Service must evaluate, for operational suitability the flight (cabin) crew sleeping quarters and rest facilities. Refer to §§ 91.1061(b)(1), 121.485(a), 121.523(b), and 135.269(b)(5).

Compliance with these special conditions does not ensure that the applicant has demonstrated compliance with the requirements of 14 CFR part 91, 121, or 135.

To obtain an operational evaluation, the type design holder must contact the appropriate Aircraft Evaluation Group (AEG) in the Flight Standards Service and request an evaluation for operational suitability of the flightcrew sleeping quarters in their crew rest facility. Results of these evaluations should be documented and appended to the applicable Flight Standardization Board Report. Individual operators may reference these standardized evaluations in discussions with their FAA Principal Operating Inspector as the basis for an operational approval, in lieu of an on-site operational evaluation.

Any changes to the approved flight (cabin) crew rest compartment configuration that affect crewmember emergency egress or any other procedures affecting the safety of the occupying crewmembers and/or related training shall require a re-evaluation and approval. In the event of any design change that affects egress, safety procedures, or training, the applicant is responsible for notifying the FAA's AEG that a new crew rest facility evaluation is required.

All instructions for continued airworthiness (ICAs) will be submitted to the Seattle AEG for approval acceptance, including service bulletins, before issuance of the FAA modification approval.

These special conditions are the same as Special Conditions 25-281-SC, except the maximum occupancy is ten rather than seven occupants, and a change to the table in Special Condition 20. The conditions provide an appropriate level of safety for the occupancy limit as only the size of the compartment will increase to accommodate the additional occupants, but all other requirements for safety, fire suppression, and

emergency evacuation will remain the same. In addition, the change to the table in Special Condition 20 is related to the location of the crew rest and specifics of the crew rest design. Stowage compartments located in the vicinity of critical equipment or located in an overhead area would typically be listed as conditional. However, this LD-MCR compartment is located in the Class C cargo compartment with all of its features that provide fire protection (e.g., the use of liner material that meets appendix F to part 25, part III; control of ventilation; active fire suppression; active fire detection; etc.). These features remain when the crew rest is installed.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

### **Discussion of Comments**

The FAA issued Notice of Proposed Special Conditions No. 25–19–07–SC for the Airbus Model A330-300 and Model A330-900 series airplane, which was published in the *Federal Register* on June 7, 2019 (84 FR 26593). No comments were received, and the special conditions are adopted as proposed.

### **Applicability**

As discussed above, these special conditions are applicable to the Airbus Model A330-300 and Model A330-900 airplanes. Should TTF Aerospace apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. A46NM to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well.



Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the *Federal Register*. However, as the certification date for the LD-MCR compartment is currently scheduled for July 2019 for the Airbus Model A330-300 and Model A330-900 airplanes is imminent, the FAA finds that good cause exists to make these special conditions effective upon publication.

### **Conclusion**

This action affects only a certain novel or unusual design feature on Airbus Model A330-300 and Model A330-900 of airplanes as modified by TTF Aerospace. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

### **List of Subjects in 14 CFR Part 25**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

### **Authority Citation**

The authority citation for these special conditions is as follows:

**Authority:** 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

### **The Special Conditions**

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Airbus Model A330-300 and Model A330-900 airplanes, as modified by TTF Aerospace.

1. Occupancy of the LD-MCR compartment is limited to the total number of installed bunks and seats in each compartment. For each occupant permitted in the LD-MCR compartment, there must be an approved seat or berth able to withstand

the maximum flight loads when occupied. The maximum occupancy in the LD-MCR compartment is ten.

- a. There must be appropriate placards displayed in a conspicuous place at each entrance to the LD-MCR compartment indicating the following information:
  - (1) The maximum number of occupants allowed;
  - (2) That occupancy is restricted to crewmembers trained in the evacuation procedures for the LD-MCR compartment;
  - (3) That occupancy is prohibited during taxi, takeoff and landing;
  - (4) That smoking is prohibited in the LD-MCR compartment; and
  - (5) That the LD-MCR compartment is limited to the stowage of personal luggage of crewmembers and must not be used for the stowage of cargo or passenger baggage.
- b. There must be at least one ashtray located conspicuously on or near the entry side of any entrance to the LD-MCR compartment.
- c. There must be a means to prevent passengers from entering the LD-MCR compartment in an emergency or when no flight attendant is present.
- d. There must be a means for any door installed between the LD-MCR compartment and the passenger cabin to be capable of being quickly opened from inside the LD-MCR compartment, even when crowding occurs at each side of the door.
- e. For all doors installed in the evacuation routes, there must be a means to preclude anyone from being trapped inside a compartment. If a locking mechanism is installed, it must be capable of being unlocked from the outside

without the aid of special tools. The lock must not prevent opening from the inside of a compartment at any time.

2. There must be at least two emergency evacuation routes, which could be used by each occupant of the LD-MCR compartment to rapidly evacuate to the main cabin and could be closed from the main passenger cabin after evacuation.
  - a. The routes must be located with one at each end of the LD-MCR compartment or with two having sufficient separation within the LD-MCR compartment and between the routes to minimize the possibility of an event (either inside or outside of the LD-MCR compartment) rendering both routes inoperative.
  - b. The routes must be designed to minimize the possibility of blockage, which might result from fire, mechanical or structural failure, or from persons standing on top of or against the escape route. If an evacuation route utilizes an area where normal movement of passengers occurs, it must be demonstrated that passengers would not impede egress to the main deck. If a hatch is installed in an evacuation route, the point at which the evacuation route terminates in the passenger cabin should not be located where normal movement by passengers or crew occur, such as in a main aisle, cross aisle, passageway, or galley complex.

If such a location cannot be avoided, special consideration must be taken to ensure that the hatch or door can be opened when a person who is the weight of a ninety-fifth percentile male is standing on the hatch or door.

The use of evacuation routes must not be dependent on any powered device. If there is low headroom at or near an evacuation route, provision must be made

to prevent or to protect occupants of the LD-MCR compartment from head injury.

- c. Emergency evacuation procedures, including the emergency evacuation of an incapacitated crewmember from the LD-MCR compartment, must be established. All of these procedures must be transmitted to the operator for incorporation into its training programs and appropriate operational manuals.
  - d. There must be a limitation in the Airplane Flight Manual or other suitable means requiring that crewmembers be trained in the use of evacuation routes.
3. There must be a means for the evacuation of an incapacitated crewmember who is representative of a 95th percentile male from the LD-MCR compartment to the passenger cabin floor. The evacuation must be demonstrated for all evacuation routes. A flight attendant or other crewmember (a total of one assistant within the LD-MCR compartment) may provide assistance in the evacuation. Additional assistance may be provided by up to three persons in the main passenger compartment. For evacuation routes having stairways, the additional assistants may descend down to one half the elevation change from the main deck to the LD-MCR compartment or to the first landing, whichever is higher.
4. The following signs and placards must be provided in the LD-MCR compartment:
- a. At least one exit sign that meets the requirements of § 25.812(b)(1)(i) at amendment 25-58 must be located near each exit. However, a sign with reduced background area of no less than 5.3 square inches (excluding the letters) may be utilized, provided that it is installed such that the material surrounding the exit sign is light in color (e.g., white, cream, light beige). If

the material surrounding the exit sign is not light in color, a sign with a minimum of a one-inch wide background border around the letters would also be acceptable;

- b. An appropriate placard that defines the location and the operating instructions for each evacuation route must be located near each exit;
  - c. Placards must be readable from a distance of 30 inches under emergency lighting conditions; and
  - d. The exit handles and the placards with the evacuation path operating instructions must be illuminated to at least 160 microlamberts under emergency lighting conditions.
5. There must be a means for emergency illumination to be automatically provided for the LD-MCR compartment in the event of failure of the main power system of the airplane or of the normal lighting system of the LD-MCR compartment.
- a. This emergency illumination must be independent of the main lighting system.
  - b. The sources of general cabin illumination may be common to both the emergency and the main lighting systems, if the power supply to the emergency lighting system is independent of the power supply to the main lighting system.
  - c. The illumination level must be sufficient for the occupants of the LD-MCR compartment to locate and transfer to the main passenger cabin floor by means of each evacuation route.

- d. The illumination level must be sufficient to locate a deployed oxygen mask with the privacy curtains in the closed position for each occupant of the LD-MCR compartment.
6. There must be means for two-way voice communications between crewmembers on the flightdeck and crewmembers in the LD-MCR compartment.

Section 25.785(h) at amendment 25-51 requires flight attendant seats near required floor level emergency exits. Each such exit seat on the aircraft must have a public address system microphone that allows two-way voice communications between flight attendants and crewmembers in the LD-MCR compartment. One microphone may serve more than one such exit seat, provided the proximity of the exits allows unassisted verbal communications between seated flight attendants.
7. There must be a means for manual activation of an aural emergency alarm system, audible during normal and emergency conditions, to enable crewmembers on the flightdeck and at each pair of required floor-level emergency exits to alert crewmembers in the LD-MCR compartment of an emergency. Use of a public address or crew interphone system will be acceptable, provided an adequate means of differentiating between normal and emergency communications is incorporated. The system must be powered in flight for at least ten minutes after the shutdown or failure of all engines and auxiliary power units (APU) or the disconnection or failure of all power sources that are dependent on the continued operation of the engines and APUs.
8. There must be a means, readily detectable by seated or standing occupants of the LD-MCR compartment, which indicates when seat belts should be fastened. If

there are no seats, at least one means, such as sufficient handholds, must be provided to cover anticipated turbulence. Seat belt-type restraints must be provided for berths and must be compatible with the sleeping attitude during cruise conditions. There must be a placard on each berth indicating that seat belts must be fastened when the berth is occupied. If compliance with any of the other requirements of these special conditions is predicated on specific head location, there must be a placard specifying the head position.

9. To provide a level of safety equivalent to that provided to occupants of a small isolated galley, in lieu of the requirements of § 25.1439(a) at amendment 25-38 that pertain to isolated compartments, the following equipment must be provided in the LD-MCR compartment:
  - a. At least one approved hand-held fire extinguisher appropriate for the kinds of fires likely to occur;
  - b. Two portable Protective Breathing Equipment (PBE) units, approved to Technical Standard Order TSO-C116 or equivalent, which are suitable for fire-fighting, or one PBE for each hand-held fire extinguisher, whichever is greater; and
  - c. One flashlight.

**Note:** Additional PBEs and fire extinguishers in specific locations, beyond the minimum numbers prescribed in Special Condition 9, may be required as a result of any egress analysis accomplished to satisfy Special Condition 2(a).

10. A smoke or fire detection system or systems must be provided to monitor each occupiable area within the LD-MCR compartment, including those areas

partitioned by curtains. Flight tests must be conducted to show compliance with this requirement. Each smoke or fire detection system must provide the following:

- a. A visual indication to the flightdeck within one minute after the start of a fire;
- b. An aural warning in the LD-MCR compartment; and
- c. A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main- passenger compartment during various phases of flight.



11. The LD-MCR compartment must be designed such that fires within it can be controlled without a crewmember having to enter the compartment or be designed such that crewmembers equipped for fire-fighting have unrestricted access to the compartment. The time for a crewmember on the main deck to react to the fire alarm, don the fire-fighting equipment, and gain access must not exceed the time for the compartment to become smoke-filled, making it difficult to locate the source of the fire.
12. There must be a means provided to exclude hazardous quantities of smoke or extinguishing agent originating in the LD-MCR compartment from entering any other compartment occupied by crewmembers or passengers. This means must include the time periods during the evacuation of the LD-MCR compartment and, if applicable, when accessing the LD-MCR compartment to manually fight a fire. Smoke entering any other compartment occupied by crewmembers or passengers when the LD-MCR compartment is opened during an emergency evacuation must dissipate within five minutes after the LD-MCR compartment is closed. Hazardous quantities of smoke may not enter any other compartment occupied by crewmembers or passengers during subsequent access to manually fight a fire in the LD-MCR compartment. (The amount of smoke entrained by a firefighter exiting the LD-MCR compartment through the access is not considered hazardous.)
- During the one-minute smoke detection time, penetration of a small quantity of smoke from the LD-MCR compartment into an occupied area is acceptable. Flight tests must be conducted to show compliance with this requirement.

If a built-in fire suppression system is used in lieu of manual firefighting, the fire suppression system must be designed so that no hazardous quantities of extinguishing agent will enter other compartments occupied by passengers or crewmembers. The system must have adequate capacity to suppress any likely fire occurring in the LD-MCR compartment, considering the fire threat, the volume of the compartment and the ventilation rate.

13. For each seat and berth in the LD-MCR compartment, there must be a supplemental oxygen system equivalent to that provided for main deck passengers. The system must provide an aural and visual warning to alert the occupants of the LD-MCR compartment of the need to don oxygen masks in the event of decompression. The warning must activate before the cabin pressure altitude exceeds 15,000 feet. The aural warning must sound continuously for a minimum of five minutes or until a reset push button in the LD-MCR compartment is depressed. Procedures for crewmembers in the LD-MCR compartment to follow in the event of decompression must be established. These procedures must be transmitted to the operator for incorporation into their training programs and appropriate operational manuals.
14. The following requirements apply to LD-MCR compartments that are divided into several sections by the installation of curtains or doors:
  - a. To warn crewmembers who may be sleeping, there must be an aural alert that accompanies automatic presentation of supplemental oxygen masks. The alert must be able to be heard in each section of the LD-MCR compartment. A visual indicator that occupants must don an oxygen mask is required in each

- section where seats or berths are not installed. A minimum of two supplemental oxygen masks are required for each seat or berth. There must also be a means to manually deploy the oxygen masks from the flightdeck.
- b. A placard is required adjacent to each curtain that visually divides or separates the LD-MCR compartment into small sections for privacy purposes. The placard must indicate that the curtain is to remain open when the private section it creates is unoccupied.
  - c. For each section created by the installation of a curtain, the following requirements of these special conditions must be met both with the curtain open and with the curtain closed:
    - (1) Emergency illumination (Special Condition 5);
    - (2) Aural emergency alarm (Special Condition 7);
    - (3) Fasten seat belt signal or return to seat signal as applicable (Special Condition 8); and
    - (4) Smoke or fire detection (Special Condition 10).
  - d. Crew rest compartments visually divided to the extent that evacuation could be affected must have exit signs that direct occupants to the primary stairway exit. The exit signs must be provided in each separate section of the LD-MCR compartment and must meet the requirements of § 25.812(b)(1)(i) at amendment 25-58. An exit sign with reduced background area, as described in Special Condition 4(a), may be used to meet this requirement.
  - e. For sections within a LD-MCR compartment that are created by the installation of a partition with a door separating the sections, the following

requirements of these special conditions must be met with the door open and with the door closed:

- (1) There must be a secondary evacuation route from each section to the main deck, or it must be shown that any door between the sections has been designed to preclude anyone from being trapped inside the compartment. Removal of an incapacitated crewmember from this area must be considered. A secondary evacuation route from a small room designed for only one occupant for a short period of time, such as a changing area or lavatory, is not required. However, removal of an incapacitated occupant from this area must be considered.
- (2) Any door between the sections must be shown to be openable when crowded against, even when crowding occurs at each side of the door.
- (3) There may be no more than one door between any seat or berth and the primary stairway exit.
- (4) There must be exit signs in each section that meet the requirements of § 25.812(b)(1)(i) at amendment 25-58, that direct occupants to the primary stairway exit. An exit sign with reduced background area, as described in Special Condition 4(a), may be used to meet this requirement.
- (5) Special Conditions 5 (emergency illumination), 7 (aural emergency alarm), 8 (fasten seat belt signal or return to seat signal as applicable) and 10 (smoke and fire detection) must be met both with the door open and the door closed.

- (6) Special Conditions 6 (two-way voice communication) and 9 (PBE and other equipment) must be met independently for each separate section, except in lavatories or other small areas that are not intended to be occupied for extended periods of time.
15. Where a waste disposal receptacle is fitted, it must be equipped with a built-in fire extinguisher designed to discharge automatically upon occurrence of a fire in the receptacle.
16. Materials, including finishes or decorative surfaces applied to the materials, must comply with the flammability standards of § 25.853 at amendment 25-66.
- Mattresses must comply with the flammability standards of § 25.853(b) and (c) at amendment 25-66.
17. A lavatory within the LD-MCR compartment must meet the same requirements as a lavatory installed on the main deck, except with regard to Special Condition 10 for smoke detection.
18. When a LD-MCR compartment is installed or enclosed as a removable module in part of a cargo compartment, or is located directly adjacent to a cargo compartment without an intervening cargo compartment wall, the following conditions apply:
- a. Any wall of the LD-MCR compartment, which forms part of the boundary of the reduced cargo compartment and is subject to direct flame impingement from a fire in the cargo compartment, and any interface item between the LD-MCR compartment and the airplane structure or systems must meet the applicable requirements of § 25.855 at amendment 25-60.

- b. Means must be provided to ensure that the fire protection level of the cargo compartment meets the applicable requirements of §§ 25.855 at amendment 25-60; 25.857 at amendment 25-60; and 25.858 at amendment 25-54 when the LD-MCR compartment is not installed.
- c. Use of each emergency evacuation route must not require occupants of the LD-MCR compartment to enter the cargo compartment in order to return to the passenger compartment.
- d. The aural emergency alarm specified in Special Condition 7 must sound in the LD-MCR compartment in the event of a fire in the cargo compartment.

19. Means must be provided to prevent access into the Class C cargo compartment, whether or not the LD-MCR compartment is installed, during all airplane flight operations, and to ensure that the maintenance door is closed and secured during all airplane flight operations.
20. All enclosed stowage compartments within the LD-MCR compartment that are not limited to stowage of emergency equipment or airplane supplied equipment (i.e., bedding), must meet the design criteria given in the table below. As indicated in the table, enclosed stowage compartments larger than 200 ft<sup>3</sup> in interior volume are not addressed by these Special Conditions. The in-flight accessibility of very large enclosed stowage compartments, and the subsequent impact on the crewmembers' ability to effectively reach any part of the compartment with the contents of a hand fire extinguisher will require additional fire protection considerations similar to those required for inaccessible compartments such as Class C cargo compartments.

	STOWAGE COMPARTMENT INTERIOR VOLUMES		
Fire Protection Features	less than 25 ft <sup>3</sup>	25 ft <sup>3</sup> to 57 ft <sup>3</sup>	57 ft <sup>3</sup> to 200 ft <sup>3</sup>
Materials of Construction <sup>1</sup>	Yes	Yes	Yes
Detectors <sup>2</sup>	No	Yes	Yes
Liner <sup>3</sup>	No	No	Yes
Location Detector <sup>4</sup>	No	Yes	Yes

<sup>1</sup>Material

The material used to construct each enclosed stowage compartment must at least be fire resistant and must meet the flammability standards established for interior components per the requirements of § 25.853. For compartments less than 25 ft<sup>3</sup> in interior volume,

the design must ensure the ability to contain a fire likely to occur within the compartment under normal use.

#### <sup>2</sup>Detectors

Enclosed stowage compartments equal to or exceeding 25 ft<sup>3</sup> in interior volume must be provided with a smoke or fire detection system to ensure that a fire can be detected within a one-minute detection time. Flight tests must be conducted to show compliance with this requirement. Each system (or systems) must provide:

- (a) A visual indication in the flight-deck within one minute after the start of a fire;
- (b) An aural warning in the crew rest compartment; and
- (c) A warning in the main passenger cabin. This warning must be readily detectable by a flight attendant, taking into consideration the positioning of flight attendants throughout the main passenger compartment during various phases of flight.

#### <sup>3</sup>Liner

If it can be shown that the material used to construct the stowage compartment meets the flammability requirements of a liner for a Class B cargo compartment, no liner would be required for enclosed stowage compartments equal to or greater than 25 ft<sup>3</sup> but less than 57 ft<sup>3</sup> in interior volume. For all enclosed stowage compartments equal to or greater than 57 ft<sup>3</sup> but less than or equal to 200 ft<sup>3</sup> in interior volume, a liner must be provided that meets the requirements of § 25.855 at amendment 25-60 for a Class B cargo compartment.

#### <sup>4</sup>Location Detector

LD-MCR compartments that contain enclosed stowage compartments with an interior volume that exceeds 25 ft<sup>3</sup> and are located away from one central location, such as the



entry to the LD-MCR compartment or a common area within the LD-MCR compartment, would require additional fire protection features or devices to assist the firefighter in determining the location of a fire.

Issued in Des Moines, Washington, on July 8, 2019.

Mary A Schooley,  
Acting Manager, Transport Standards Branch,  
Policy and Innovation Division,  
Aircraft Certification Service.  
[FR Doc. 2019-14784 Filed: 7/10/2019 8:45 am; Publication Date: 7/11/2019]